

The Kitting Out Cheap Handout

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This document is supplemental material for after the panel. It covers the same ground, but in more depth. With this, we hope you will know *what you need to learn*.

I. Before you do anything, first read up on what exists. You can't make good decisions without knowledge; you can't shop for bargains without knowing what there is to *buy*. Try:

***Sound Advice: The Musician's Guide to the Recording Studio*, Wayne Wadhams**

You need to learn about what a recording studio does. You need to know the value of a low sound floor (meaning a very quiet, non-echoing room), and a room that simply *sounds good*. You need to know about the various types of microphones (large-can condenser, small-can condenser, dynamic, etc.), and about things like XLR connectors and TRS connectors.

Also, for critical advice in setting up a recording space - key to *any* successful studio - read:

***Mixing Secrets for the Small Studio*, Mike Senior**

Read the first three chapters before you even consider picking your recording space. You can make several purchase decisions without it, but when it comes to arranging your environment, these three chapters are crucial. As a bonus, this book will teach you a lot about mixing. That's beyond the scope of this handout, but is obviously just as important overall.

II. Learn to recognise quality and what stands out a bit. I talk a lot about this here:

<http://crimeandtheforcesofevil.com/blog/2012/02/thrift-and-pawn-shop-spelunking/>

Thrift shop spelunking isn't what it used to be; all the pawns found eBay, and now price against it. But it's still worth dropping in once in a while, if one is convenient.

III. Learn to solder. I can't stress this enough. If you want to save money, be ready to DIY and repair things. You're trading *time* to get *value* and save *money*. If you've learned enough from research, it's not much time for a *lot* of value.

This is a reasonable how-to-solder video, but DO NOT use lead! Use silver-nickel instead:

<http://blip.tv/make/learn-how-to-solder-skill-building-workshop-130343>

IV. Here's a list of what you need, with tips on each item. I have a whole series on this on by band blog. The blog post series also talks about making a room into a good recording space:

<http://crimeandtheforcesofevil.com/blog/2013/06/the-studio-buildout-series/>

Or just go to crimeandtheforcesofevil.com, click on blog, then scroll down and look for "studio buildout series" in the left column.

In Studio:

A. Computer, to run studio software

If you're building your own, or upgrading a donor machine, try gamer gear websites and look at equipment in the clearance sections. It'll have been top of the line gamer gear 18 to 24 months ago, and it'll be 75% off.

B. Digital Audio Workstation software

A digital audio workstation (or DAW) is basically a recording studio mixing board and editing table implemented in software. Good ones also do lots of other things, and support effects plugins. Garage Band is a simple example.

If you have money, Pro Tools is a standard - but it's not the only option. Audacity and Ardour are popular open-source packages. Audacity is much easier to learn, but will limit you. Ardour is *brutal* to start, but does amazing things once understood. There's also Rosegarden, for MIDI-heavy artists.

Here's a list of reasonably well known DAW options; if license status isn't mentioned, it's closed/pay software:

Linux: Ardour, Rosegarden, Audacity (all free/open source)

Windows: Sonar, Pro Tools, Cubase, Audacity (free/open source),
Reaper (30-day full-function trial)

Mac/OSX: Logic Pro, Pro Tools, Cubase, Ardour (free/open source),
Audacity (free/open-source), Reaper (30-day full-function trial)

C. TRS and XLR interface/external sound card with no less than two connection points, and which can supply "phantom power," which is needed by many microphones.

Essentially all microphones of even semiprofessional quality use XLR connectors and cables. They can be seen here:

http://en.wikipedia.org/wiki/XLR_connector

Most instrument pickups use 1/4" TS connectors, or occasionally, 1/4" TRS connectors. You've seen these.

http://en.wikipedia.org/wiki/TRS_connector

A good external sound interface will let you plug in either or both, and will convert the sound to digital and send it to your DAW software digitally over a USB cable, or Firewire. At our budget, you want an external sound card because computers are full of electrical noise. Moving the analogue to digital conversion outside the computer solves many problems, tho' there are downsides, particularly on USB.

At lowest cost, I like the M-Audio USB FastTrack Pro, no longer made but commonly found used. Only two inputs, but that's enough if you're just recording yourself. Lately, I'm using a six-input TASCAM US-800 I got for cheap on clearance - but the MIDI doesn't work with Linux at all, so be aware of that.

D. Microphone (pref. pair), cables, stand

As mentioned, there are many microphone types. The large-can condenser microphone is almost always the cheapest general-purpose solution of quality. The MXL 990 is probably the cheapest you can get which is worth having at all, but I'm not a fan. Consider the M-Audio Nova, or *maybe* AKG Perception 200.

You may find "USB microphones" for sale, some of which will be large-can condenser microphones. For music recording, I *do not* recommend them; they are too limiting. But for podcasting, they're everything you need. Try the M-Audio Producer, or the Blue Yeti; both are good podcast announcer mics.

E. Reference headset

You'll need to be able to listen to your recordings. In particular, you'll need to be able to listen to one track while recording another - say, listen to the instrument part you recorded earlier, while singing a vocal track. You need headsets that enclose your ears, to prevent sound leakage, and you want flat response across both low-pitched and high-pitched sounds.

A cheap quality example: Shure SRH-440, made specifically for this market by a company that knows it. **DO NOT USE NOISE-CANCELLING HEADPHONES OF ANY KIND.** They will distort your playback in ways you won't predict.

F. A good room/Sound control (A good-sounding room, baffles, blankets, etc.)

You need to make your room sound good. I can't stress this enough. If the room isn't quiet, if it's reflective, if it has lots of weird angles and does weird muddying things to sound, *no amount of good equipment will fix it.* In fact, Jeff Bohnhoff correctly points out that better equipment will often make a bad room *worse*.

Here's my article talking about why the room matters. It's in a home-stereo situation, but all of this applies even more to a studio:

<http://crimeandtheforcesofevil.com/blog/2012/06/rooms-and-sound/>

The room needs to be quiet, obviously. But the "sound" of the room matters just as much. Fundamentally, if you don't like music *played* in a room, you won't like it *recorded* there either. (Again: *Mixing Secrets for the Small Studio*, Mike Senior.)

Here's my YouTube HOWTO video on making nearly-free sound baffles:

<http://www.youtube.com/watch?v=toz0DozVNas>

Also, you can make highly effective bass traps for the corners of your room (basically a bass-specific version of the same idea, really important in corners where you get weird standing-wave action going on) by wrapping Corning 702 rigid fibreglass in a couple of layers of thin fabric. If you're getting weirdness in low frequencies, investigate this.

Almost as critical but not strictly required:

G. Studio monitor amp

Listening on headset is not the same as listening on speakers. For that, you'll need both an amp and monitor speakers.

Cheap amp suggestions: 70s and early-80s Pioneer (particularly SA series) and Harmon-Kardon integrated amps, with their capacitors replaced with new ones of identical value. Bypass the tone knobs. If you really know what you're doing, old tube equipment; EICO if you can find them are cheap but awesome.

This is where soldering saves serious dosh: I have an EICO ST-40. I paid 25 cents. My Pioneer SA-5200 cost \$20. The replacement capacitors cost as much.

As a rule, I find older equipment easier to repair than new, just because the parts are bigger and spaced further apart. It's something to keep in mind.

H. Studio monitor speakers (multiple sets with different sound profiles, ideally)

The Realistic Minimus-7 is a tiny speaker made by Radio Shack starting in 1978. It was a new and then-radical simplified design and about the best thing they ever made. They're a cult item - particularly the black ones - but you can get white metal pairs on eBay for \$20. Buy those and the simpler film-capacitor crossover upgrade kit sold by ray17760 on eBay. (\$13ish.) There's no low-end to speak of - particularly below 70hz - but they are laser-like in precision, once upgraded.

The Minimus-11 series were a larger version; maybe worth having as a second sound profile. You'll want to upgrade those crossover circuits as well.

Some junk "computer speakers" are a good third sound profile because so many people listen to music on those now, you'll want to make sure people can hear you on them. Don't mix to them, but check on them occasionally. Get those free at a yard sale.

OR

G and H: Self-powered monitors

These are basically speakers with amps built in, specifically designed for this purpose. Do not confuse these for self-powered consumer *computer* speakers; these are designed from the ground up for mixing. The cost savings here come from the amps and speaker pairings being specifically built around each other.

In closing: the best extra dollar spent is spent improving your recording space, not your gear.

Once you have the basics, if you have a dollar left over to spend on a better mic, vs. one improving your iffy room, *spend it on the room*. I know I harp on this, but it's true. Why?

A better room will make up for poor equipment.

Better equipment will make a poor room sound worse.

For Playing Out:

A. PA amp that can handle your instrument and mic.

This is where you really need to be able to identify the thing that shouldn't be where you found it. For me, that was a Samson S63. Six inputs, individually mixed, effects channels, the whole lot, for around \$100. Whatever you get, throw as many different things at it as you can to test it.

B. One decent mains speaker (can be integrated with amp)

For me, this was again finding the thing that stood out in a pawn shop. I have a Crate UFM-15H snagged for <\$100. It had a blown tweeter coil that cost \$26 to replace. As this model had a habit of blowing those at high volumes - far higher than I'd ever need - I added inline fuses to prevent that.

I also use a pair of Phonic 710s at lower volume for left and right fills, at lower volumes. (And I built a cable device to lower and balance their volume against the Crate. Soldering at work!) They're being cleared, so if you find them, they'll be sharply discounted. They also work ok as mains in house concerts.

If you you're looking for all-in-one self-powered solutions - meaning speakers with built-in amps and mini-mixers - consider the Mackie SRM-150. The advantage of a unified system is that the amp and speaker will be tailored specifically for each other, a real advantage. QSC monitors are also worth checking.

C. Vocals microphone, cables, stand.

The Shure SM-58. Old, beat up, filthy, doesn't matter, you can't kill these things. Not the sound quality of a newer-era microphone but a sound people know and expect, and durable, durable, durable. Perfect for the road. \$70ish if you dig. Also, Limewire cables carry a lifetime warranty, no questions asked. One goes bad, take it in, get it swapped out.